

petition. We answer that our Association does not prevent honest competition but only that which allows a man to figure on work at less than its cost and take a chance that he will be able to scamp it to recoup himself for the loss. It prevents the competition that induces bad work, endangers the life of the occupant of the house and brings many other evils in its train: but fair and honest competition is just as keen as ever it was. The Association merely says that a man shall receive sufficient for his work to enable him to give his undivided attention to every detail in connection therewith, so that when the work is finished it will be perfect in all its parts—an evidence of the ability and skill of the plumber and a credit to the association to which he belongs. There are many other advantages which will accrue to the general public from our Association, but if they receive no other benefit than the fact that they will be assured of good and sanitary plumbing then our association will have accomplished a great deal and the public will have received a most inestimable benefit.

And now let me ask the members present, is the Association a benefit to you? Have we done well in forming our Association? Has it stopped the habit of scrambling after the pennies and awakened you to a full realization of the position you should occupy?

Do you not find that to be a good member of the Association you must make a careful study of the laws of hygiene and sanitation and that you must be familiar with heating and ventilation in all its branches, that you must understand the physics of your profession as well as the practical application of all rules that govern our trade. If you are a good member you will become an expert in all its branches, be reliable and trustworthy. Your best efforts will be given to the uplifting and upbuilding of your business. Your best services will always be at the command of the public but you can demand, and will receive a fair compensation therefor. You lose nothing by being a member of the Association and you have everything to gain. It enlarges your mind and your vision is not dimmed by the petty jealousies that sometimes exist between competitors in the same business. All are equal in the Association. One man is as good as another. A healthy rivalry exists and competition is based on real merit and ability and each man's business grows and prospers according to his individual efforts. Such is the work of our Association. May it continue to grow and prosper. It has had great growth, wonderful development and will grow until it reaches the ideal state I have outlined, if every member is true to himself, true to his organization and obedient to the laws of our Association.

The programme of the evening consisted of songs, recitations and speeches by members, aided by Mr. Bert Harvey. The speakers of the evening included Messrs. Fiddes, McMichael, Anthes, Malcolm. After expressing their gratitude for the enthusiastic way in which the members had worked to organize the Association they touched upon points in Mr. Armstrong's address and expressed their desire to see the Association grow so that it would not only be of benefit to themselves but to the general public.

A unanimous vote of thanks to Mr. Armstrong for his able address was adopted.

The singing of the National Anthem brought to a close a very enjoyable evening.

TESTS OF MASONRY PIERS.

Several years ago the Austrian society of engineers and architects made a very important series of tests of full sized arches brick, stone and concrete, and the report of these trials, together with the accompanying analysis, proved a most valuable contribution to engineering literature. This work has now been supplemented by some important tests upon the strength of masonry piers, the tests being made under the supervision of the same committee which conducted the arch tests, the results being published in a recent issue of the *Zeitschrift des Oesterr Ingenieur und Architekten Vereines*.

The tests were made in all cases upon one-half metre square in cross section and one metre in height, the pressure being applied by means of a 1,200 ton hydraulic press at the Poldihutte at Kladno. The report gives an illustrated description of this press, which was originally constructed for forging steel, and which had already been employed for testing on similar work by Herr Ludwig Huss, former member of the arch-test committee. The press was carefully calibrated to determine its internal frictional resistances, and the gauges upon which the pressures were read being also calibrated, it was possible to determine the true pressure upon the test piers very closely.

Various kinds of piers were subjected to the tests, for the details of which the reader must be referred to the original report. Among those tested were piers of granite, sandstone, concrete, common and reinforced, and brick. The reinforced concrete construction was tested in two different types, one having embedded in it vertical wire rods 12 m in diameter, and the other containing wire cages, of which the principal members were parallel to the surfaces of pressure. In all cases much care was taken to insure that the load should be central, with the exception of certain tests which were purposely made to determine the effect of eccentric loading. The records were taken at the moment of the appearance of the first cracks, and at the time of ultimate crushing, these results being fully tabulated in the report.

The tables are very full in details and but a few results can be given here. Thus a pier of hard bricks laid in Portland cement sustained, after six months, a load of 1,365 pounds per square inch before cracks appeared, and crushed under 2,275 pounds. Granite blocks laid in Portland cement crushed under 8,100 pounds per square inch, while piers of sandstone rubble, laid in Portland cement, showed cracks under a load of 2,750 pounds, and crushed under 3,200 pounds.

The most interesting tests, however, were those which showed the resistance of ordinary and reinforced concrete piers. A pier of solid concrete after 3½ months, crushed under 1,780 pounds per square inch, the rupture taking place almost without warning cracks. A similar pier reinforced by the insertion of vertical wire rods held together by circumferential bands, and tested also after 3½ months stood a pressure of 2,470 pounds per square inch before the appearance of cracks, and crushed only after the application of a load of 3,800 pounds. Even then the pier did not altogether give way, the core remaining partially unbroken. The results of these tests showed the importance of placing the metal reinforcement where it can act to the best advantage. A moderate increase in the strength of the circumferential bands would have added greatly to the strength of the whole pier without adding appreciably to the cost, while the large margin of strength remaining after the appearance of the first cracks show how structures constructed on this principle may be made free from sudden disaster. The care with which these tests were made, and the fullness with which the results are recorded, render this report a valuable document, worthy of association with the large report of the same committee upon arch tests and it adds one more to the many contributions to engineering knowledge by the Austrian Society.